

spot in base of marginal and discal cells, in middle of first basal, and a large one in second basal and anal cells. Length 11—13 mm.

San Bernardino County, Cal., and New Mexico. Five specimens in July and August.

74. *A. fannus* Fabr.

Heretofore known only from South America and the West Indies. A specimen labeled as having been collected in Florida was in a small collection sent me for names by Mr. C. W. Johnson, of Philadelphia, Pa.

75. *A. arenosa* n. sp.

Closely resembles *Anthrax vulpina* (No. 64, supra), but differs as follows: Face black, scarcely produced below. First two antennal joints subequal in length, base of the third joint short-conical. A cross-band of black tomentum on the fourth abdominal segment. Brown of wings very pale, axillary cell slightly infumated, the brown in second basal and anal cells not darker in their apices than elsewhere. Length 6 mm. New Mexico. A single specimen in June.

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DESCRIPTIONS OF NEW, OR LITTLE-KNOWN NORTH AMERICAN HARVEST-SPIDERS (PHALANGIIDÆ).

By CLARENCE M. WEED, D. Sc.

The present paper contains some of the more important results of a study—made partly during the writer's connection with the Ohio Agricultural Experiment Station—of a large collection of Phalangiidæ gotten together during the last eight years. For a considerable proportion of this material I am indebted to the kindness of the following gentlemen: Prof. Wm. B. Alwood, Prof. Geo. F. Atkinson, Mr. Nathan Banks, Mr. Lawrence Bruner, Prof. J. H. Comstock, Mr. D. W. Coquillett, Prof. S. A. Forbes, Prof. H. Garman, Prof. C. P. Gillette, Prof. D. S. Kelliecott, Mr. Theodore Pergande, Mr. H. E. Weed and Prof. C. W. Woodworth. The drawings from which the accompanying plates have been engraved were made by Miss Freda Detmers, to whose artistic skill I have so frequently been indebted.

Liobunnum nigropalpi (Wood) Weed. Plate IV.

Phalangiun nigropalpi Wood, Comm. Essex Institute, vol. vi, pp. 22—23, 39.

Phalangiun nigropalpi Wood. Underwood, Can. Ent. vol. xvii, p. 168.

Liobunnum nigropalpi (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 6—7 mm. long, 4 mm. wide; palpi 5 mm. long. Legs: first, 40—

51 mm.; second, 75--92 mm.; third, 39--48 mm.; fourth, 60--70 mm. Body elongate, narrowed posteriorly. Dorsum reddish brown, of a nearly uniform tint, with a faint central marking, and scattered yellowish spots; minutely tuberculate. Eye eminence black, slightly canaliculate, with a row of rather small, black, distant tubercles on each carina. Mandibles light yellowish brown, tips of claws black; second joint with sparse hairs. Palpi well developed; black, except tarsus, which is brownish: a row of tubercles on outer ventro-lateral surface of femur; femur, patella and tibia each somewhat arched; a few tubercles on lateral surface of proximal portion of patella, and a row of flattened black tubercles on the inner ventro-lateral surface of tarsus; ventral surface of tibia clothed with stiff black hairs. Ventral surface, including coxæ, of nearly the same color as the dorsum, but a little lighter; coxæ tipped with white. Legs very long and slender; trochanters dark brown, more or less blackish; rest of legs blackish. Genital organ flattened, bent with a double low-like curve, contracted at its distal extremity, and ending in short acute point.

Female.—Body 7.5 mm. long, 4.5 mm. wide; palpi 5 mm. long. Legs: first, 37 mm.; second, 70 mm.; third, 38 mm.; fourth, 51 mm. Differs from male as follows: Body larger, rounder; central marking more distinct; inner distal lateral angle of patella more conical; row of tubercles on tarsus of patella obsolete; legs brown rather than black.

North Carolina: Blaming Rock, August, 1889 (Geo. F. Atkinson). Ohio: Fairfield County, Sept. 20, 1890. Pennsylvania: Huntingdon County (Wood). Described from many specimens.

This handsome species is quite rare. The only living specimens I have seen were those collected in Fairfield County, Ohio, in September, 1890. In the woods on the top of a high hill I saw several pairs running about after each other one afternoon, evidently courting.

I have also some specimens collected by Prof. D. S. Kellicott in Shiawassee County, Michigan, that I have referred to this species with considerable hesitancy. If they belong to it they are not fully developed, as the body and legs are light colored and soft. The trochanters of the males are blacker than in normal fully developed specimens. There is a distinct, interrupted, black marking on the dorsum of the females.

Liobunum ventricosum (Wood), Weed. Plate V.

Phalangium ventricosum Wood, *Conn. Essex Inst.*, vol. vi, pp. 32-33, 39, fig. 7.

Phalangium ventricosum Wood. *Packard's Guide to the Study of Insects*, p. 657, fig. 633.

Phalangium ventricosum Wood. *Underwood, Can. Ent.* vol. xvii, p. 169.

Liobunum (?) *ventricosum* (Wood). *Weed, Amer. Nat.* vol. xxi, p. 935.

Liobunum (?) *ventricosum* (Wood). *Weed, Bull. Ill. State Lab. Nat. Hist.* vol. iii, p. 104.

Liobunum ventricosum (Wood). *Weed, Amer. Nat.* vol. xxiv, p. 918.

Male.—Body 7 mm. long; 4.5 mm. wide; palpi 5 mm. long. Legs: first, 35 mm.; second, 68 mm.; third, 35 mm.; fourth, 53 mm. Body elongate; abdomen conical or pear-shaped. Dorsum, legs including trochanters, and palpi varying

from dark cinnamon-brown to ferruginous brown, most commonly cinnamon rufous. Ventrums light grayish brown. Dorsum closely granulate with an indistinct darker marking, and numerous small grayish spots arranged in irregular transverse series. Eye eminence black, except at base; rounded, not caniculate, smooth, or with a few small, acute tubercles. Palpi rather slender, with none of the angles prolonged; femur with a very few small spinous tubercles and hairs; patella strongly, and femur and tibia slightly, arched; coxæ minutely tuberculate, tipped with white; trochanters and legs cinnamon rufous; tarsi dusky. Legs long and moderately robust. Genital organ of male "flat, nearly straight, slender at the basal portion, gradually widening and distally rather quickly expanded into a broad alate portion, and then abruptly contracted into a moderately robust, slightly curved point, which is placed at an angle to the rest of the shaft; at the base of the point a marked notch in the end of the shaft."

Female.—Body 10.5 mm. long; 5.5 mm. wide; palpi 5 mm. long. Legs: first, 32 mm.; second, 62 mm.; third, 32 mm.; fourth, 45 mm. Differs from the male in the very much larger size of its body. The abdomen in most specimens is greatly swollen, especially below.

Illinois: Champaign County. Maine: Penobscot County (F. L. Harvey). Michigan: Shiawassee County (D. S. Kellicott). Nebraska: Lancaster County (Lawrence Bruner). New York: Tompkins County, June 30, 1886 (J. H. Comstock); before June 1, 1890 (Nathan Banks). North Carolina: Blaming Rock (Geo. F. Atkinson). Ohio: Franklin County, June 13, 1889; July 8, 1890; September 25–30, 1888; Warren County, August 7, 1890.

Two of the Michigan specimens are males and have the joints of the palpi much more arched than usual.

Liobunnum verrucosum (Wood) Weed. Plate VI.

Phalangium verrucosum Wood, Comm. Essex Institute, vol. vi, pp. 29–30, 40.

Phalangium verrucosum Wood. Underwood, Can. Ent. vol. xvii, p. 168.

Male.—Body 6.5 mm. long; 4.5 mm. wide; palpi 4.5 mm. long. Legs: first, 32 mm.; second, 64 mm.; third, 31 mm.; fourth, 46 mm. Dorsum of a beautiful golden color, appearing as if the surface had been gilded over, the back-ground being a clear reddish brown, which in the specimen at hand is visible on the front of the cephalothorax and more or less on margins of abdomen. Dorsum minutely tuberculate. Eye eminence prominent, constricted below, black except at base, canaliculate, with a series of well-developed tubercles on each carina. Just caudad of eye eminence on cephalothorax is a slightly impressed transverse line, behind which is another one much deeper. Palpi brownish; tip of femur with patella darker; thickly beset with stiff hairs and proximal joints having a few scattered tubercles; joints arched. Ventral surface in specimen at hand vermilion-red, especially coxæ, but ordinarily probably varies from light brown to this color; coxæ tuberculate; tipped with white. Legs rather long; trochanters blackish, somewhat tuberculate; rest of legs reddish brown. Genital organ (according to Wood) "very broad, rather short, nearly straight, thickened and somewhat dilated distally where it is alate, abruptly contracted into a rather

robust end, which finally terminates in a very acute point, which is bent at an angle to the shaft, and furnished with two pairs of small lateral hooked spines at the base of the slender portion."

Female.—Body 7.5 mm. long; 5 mm. wide; palpi 4.5 mm. long. Legs: first, 32 mm.; second, 61 mm.; third, 33 mm.; fourth, 48 mm. Differs from male as follows: Body more rounded; dorsum golden-brown, with a faint indication of the central marking (but without the gilt coating) and with grayish spots on the abdomen; tuberculation more minute. Palpi lighter, with inner distal angle of patella distinctly prolonged into a conical apophysis. Legs, except trochanters lighter brown, less reddish. Ventrums grayish brown, with coxæ approaching vermilion.

New York: Queens County (Nathan Banks).

I have only two specimens of this very beautiful species. They were collected at Sea Cliff, Long Island, during July, 1890, by Mr. Nathan Banks, to whom I am indebted for a large number of our most interesting Phalangiidae. The two forms resemble each other so much that I have considered them the two sexes of the one species.

Previous to the discovery of these specimens I had identified as *L. verrucosum* the species described below as *L. nigripes*.

Liobunum nigripes n. sp. Plate VII.

Liobunum verrucosum (Wood). Weed, Amer. Nat. vol. xxi, p. 935.

Liobunum verrucosum (Wood). Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, pp. 88-89, 102.

Liobunum verrucosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 6.5 mm. long; 4 mm. wide; palpi 4.5 mm. long. Legs: first, 27 mm.; second, 50 mm.; third, 28 mm.; fourth, 30 mm. Dorsum minutely tuberculate, almost appearing finely granulate, ferruginous brown, somewhat darker in front, with a faint indication of a dark central marking in some specimens, and indistinct transverse rows of yellowish dots. Eye eminence well pronounced, slightly longer than high, black above, very slightly canaliculate, with two rows of small, black tubercles, frequently subobsolete. Mandibles light brown, tips of claws black; second article with sparse, dark hairs. Palpi slender, grayish or brownish in some specimens, with more or less black on basal joints; femur with short, scattered hairs; ventral surface beset with well developed black tubercles; patella curved, with short hairs and small black tubercles; tibia and tarsus thickly beset with short hairs, without tubercles, except a subobsolete row on the inner ventro-lateral surface of tarsus. Ventrums grayish brown, cephalic portion tuberculate. Legs, including trochanters, black; trochanters tuberculate; femora, patellæ and tibiæ with rows of small spines. Shaft of genital organ straight except at tip, broad, flat; about two-thirds of the way from the base to the apex expanding into an alate portion, which continues for about one-fifth the entire length of the shaft, then suddenly contracting into a rather robust, curved, canaliculate end, and terminating in an acute point; with two curved spinous hairs just behind the base of the jointed tip.

Female.—Body 9 mm. long; 4 mm. wide; palpi 4.5 mm. long. Legs: first, 28 mm.; second, 48 mm.; third, 26 mm.; fourth, 40 mm. Besides its larger size the female differs from the male in the much darker color of the dorsum, which

varies from dark ferruginous brown to almost black; in color of venter, which is grayish rather than brown; and in having the legs, except trochanters, brown rather than black.

Illinois: Champaign, June, July, 1887. Ohio: Clermont County, August, 1890; Franklin County, July 7-10, 1890; Warren County, June 28, July 23, 1890. Described from many specimens.

The sexes of this species are quite unlike. In first going over my collections I separated the males in one series and the females in another, thinking them different species, but on finding that the specimens of one of the supposed kinds were all males and the others all females, and that in nearly every instance the two forms had been taken at the same time and place, I had little hesitancy in considering them the same.

During July, 1890, this form was very common in central Ohio. But it does not appear to be so in other places, as I have no specimens among the many harvest spiders sent me by friends from other States.

Liobunum maculosum (Wood) Weed. Plate VIII.

Phalangium maculosum Wood, *Conn. Acad. Sci. Trans.* vol. vi, pp. 31-32, 40.

Phalangium maculosum Wood. Underwood, *Can. Ent.* vol. xvii, p. 168.

Phalangium (?) *maculosum* Wood. Weed, *Bull. Ill. State Lab. Nat. Hist.* vol. iii, p. 104.

Liobunum maculosum (Wood). Weed, *Amer. Nat.* vol. xxiv, p. 918.

Male.—Body 8 mm. long; 4.5 mm. wide; palpi 5.5 mm. long. Legs: first, 19 mm.; second, 33 mm.; third, 21 mm.; fourth, 26 mm.

Female.—Body, 11 mm. long; 6 mm. wide; palpi 5 mm. long. Legs: first, 16 mm.; second, 32 mm.; third, 20 mm.; fourth, 27 mm.

Body large; dorsum granulate, cinnamon-brown, with an indistinct darker, vase-shaped central marking, beginning at the eye eminence, contracting slightly on the first abdominal segment, and then slightly expanding and running with nearly parallel sides to the posterior extremity; a great many small yellow spots on the abdominal segments arranged in irregular transverse series (in the male under examination there is on the front margin of the middle of the first abdominal segment, and between that and the eye eminence on the cephalothorax transverse masses of minute golden dots); in front of eye eminence is a whitish V-shaped mark. Eye eminence well developed; black, except a whitish spot at the base both in front and behind; contracting from base upward; scarcely canaliculate; with two subobsolete rows of blackish tubercles. On the front margin of the cephalothorax, directly in front of the eye eminence, is a patch of three rows of small black tubercles, sometimes subobsolete; other similar, but smaller tubercles are scattered near the rest of the margin of the cephalothorax. Mandibles brownish white, with tips of claws deep black. Ventral surface of palpi very light brown, almost white; dorsal surface brown, femur and patella darker than the rest; inner distal angle of femur and patella slightly prolonged in female, scarcely so in male; femur, patella and tibia furnished with rows of

spinous tubercles, which on tarsus are represented by similar, but more numerous rows of stiff spines. Ventral surface very light brown, almost whitish; coxæ tuberculate, same color as rest of venter. Trochanters black, rest of legs cinnamon-brown, darker at articulations; proximal joints having numerous spinose tubercles. Genital organ of male "robust, somewhat flattened, distally alate, bent through its entire length with a double, bow-like curve; at its distal extremity blunt, not bent, with a sharp, slender, straight, projecting point."

Ohio: Lawrence County, July, 1889; Warren County, Pennsylvania (Wood). West Virginia (E. D. Cope, H. C. Wood). Described from one male and three females.

This species bears a close general resemblance to *L. grande* (Say), but is distinguished by its softer texture, lighter color and smooth dorsum. It is comparatively rare.

Liobunum grande (Say) Weed.

Phalangium grandis Say, Jour. Phil. Acad. Nat. Sci. vol. ii, pp. 67-68. Compl. Writings, vol. ii, p. 14.

Phalangium grande Say. Wood, Comm. Essex Inst. vol. vi, pp. 34, 40.

Phalangium grande Say. Underwood, Can. Ent. vol. xxiv, p. 168.

Phalangium (?) *grande* Say. Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, p. 105.

Astrohunnus (?) *grande* (Say). Weed, Amer. Nat. vol. xxiv, pp. 914, 915, 917.

Male.—Body 9 mm. long; 5 mm. wide; palpi 6 mm. long. Legs: first, 21 mm.; second, 36 mm.; third, 23 mm.; fourth, 32 mm. Dorsum minutely tuberculate, with numerous larger, black, spinose tubercles scattered thickly over the surface, being especially numerous on the cephalothorax and anterior portion of abdomen and occurring in a dense quadrangular patch just in front of eye eminence. Dorsum varying from ferruginous brown to almost black, with numerous small, yellowish, not very distinct spots on the abdomen arranged in irregular transverse series, sometimes subobsolete, having a dark brown central vase-shaped marking beginning at the sides of the eye eminence, where it is quite broad, and contracting until it reaches the middle of the first abdominal scutum, then gradually expanding to the middle of the abdomen, then again gradually contracting toward posterior extremity; this band sometimes obsolete, or nearly so. Eye eminence black, prominent, rounded, somewhat canaliculate, each carina usually having a row of five or six well-developed, acute, black, conical tubercles. Segmentation of cephalothorax with abdomen not very distinct, and of anterior abdominal segments nearly obsolete. Palpi dull yellowish brown, often mottled with black, especially on patella and tip of femur; rather long, slender, with the inner distal angle of patella sometimes slightly prolonged; joints slightly arched, especially patella; femur, patella, especially on dorsal surface, and tibia, furnished with numerous, black, spinose tubercles and hairs; tarsus furnished with hairs, and with a row of tubercles on its inner ventro-lateral surface. Mandibles light yellowish brown, tips of claws black; second joint furnished with numerous stiff, blackish hairs. Venter light brown or grayish; sides of pectus and coxæ tuberculate; trochanters black, tuberculate; remaining portions of legs dark brown, except the joints and tarsi, which are blackish. Genital organ similar to that of *L. maculosum*.

Female.—Body 12 mm. long; 6.5 mm. wide; palpi 6 mm. long. Legs: first, 20 mm.; second, 35 mm.; third, 21 mm.; fourth, 28 mm. Differs from the male

in its larger body, especially the abdomen, and in having fewer tubercles on the dorsum and palpi.

District of Columbia: Washington, Sept. 5, 1890 (Nathan Banks). Illinois. Ohio: Franklin County, Aug. 4, 1890; Fulton County, August, 1890; Lawrence County, July, 1889, Sept. 5, 1890; Warren County, July 5, 18, August, 1890. Virginia: Montgomery County (William B. Alwood).

The females of this species are very similar to those of *L. maculosum*. Plate IX, which represents the variety described below, will also do for this form.

Liobunum grande (Say) var. *simile* Weed. Plate IX.

Liobunum similis Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—This variety is at once distinguished by the deep black color of the palpi and mandibles. It does not differ in other respects from normal *grande*.

Ohio: Cuyahoga County, August, 1889; Butler County, September, 1890.

I have not seen any females with the peculiar markings of this variety.

Trachyrhinus favosus (Wood), Weed. Plate X.

Phalangium favosum, Wood, Comm. Essex Institute, vol. vi, pp. 28-29.

Astrobinus (?) *favosum* (Wood). Weed, Amer. Nat. vol. xxiv, p. 917.

Trachyrhinus favosus (Wood). Weed, Amer. Nat. vol. xxvi, p. 529.

Male.—Body 7 mm. long; 5 mm. wide. Legs: first, 21 mm.; second, 40 mm.; third, 21 mm.; fourth, 26 mm. Body very hard; dorsum nearly square and quite level; having projecting angles on the anterior lateral corners; grayish, spotted with black, and a faint central marking; coarsely punctate "so as to have a worm-eaten, almost honey-combed appearance." Eye eminence slender, rather high, light brown, with several robust acute spines, which are at their bases gray, but are tipped with black. Palpi roughened with numerous small blackish spines. Legs grayish with more or less black on proximal portions.

Described from several specimens received from Mr. Lawrence Bruner, collected at Lincoln, Neb.

EXPLANATION OF PLATES.

PLATE IV.

Fig. 1.—*Liobunum nigropalpi* (Wood), male. Natural size.

" 2.—Parts of same. Magnified.

" 2a.—Body.

" 2b.—Eye eminence. Side view.

" 2c.—Eye eminence. Front view.

" 2d.—Palpus. Side view.

" 2e.—Claw of palpus. Side view.

PLATE V.

- Fig. 1.—*Liobunum ventricosum* (Wood), male. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.
 “ 2f.—Maxillary lobe of second pair of legs.

PLATE VI.

- Fig. 1.—*Liobunum verrucosum* (Wood), male. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.
 “ 2k.—Patella of palpus of female, seen from above.

PLATE VII.

- Fig. 1.—*Liobunum nigripes* Weed, male. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.

PLATE VIII.

- Fig. 1.—*Liobunum maculosum* (Wood), female. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.

PLATE IX.

- Fig. 1.—*Liobunum grande* (Say) var. *simile* Weed, male. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.
 “ 2g.—Maxillary lobe of second legs.

PLATE X.

- Fig. 1.—*Trachyrhinus favosus* (Wood), male. Natural size.
 “ 2.—Parts of same. Magnified.
 “ 2a.—Body.
 “ 2b.—Eye eminence. Side view.
 “ 2c.—Eye eminence. Front view.
 “ 2d.—Palpus. Side view.
 “ 2e.—Claw of palpus. Side view.